SELECTED CORRELATES OF CRITICAL THINKING IN DIPLOMA NURSING STUDENTS

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by
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An Abstract of a Thesis by
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The Problem. The purpose of this study was to determine if significant relationships existed among critical thinking and psychomotor skills and selected experiential, demographic and educational variables in first semester diploma nursing students.

Procedure. Beginning nursing students were administered the Watson-Glaser Critical Thinking Appraisal to measure critical thinking ability. After instructional information was reviewed, students were observed for psychomotor skill performance using a skills checklist form developed by their instructors. Additional data obtained from student files included: age, gender, high school and previous higher education GPA, previous work experience, and previous courses in higher education.

Findings. Significant correlations were found between ability to think critically and age, total previous courses taken, and courses taken in behavioral sciences. No significant relationship was found between ability to think critically and psychomotor skill performance, high school GPA, or GPA from previous courses taken in higher education. No significant difference was found between ability to think critically and gender or previous work experience.

Conclusions. Factors that influence critical thinking ability should be considered as entrance requirements to diploma nursing programs. Nursing educators influence students' ability to think critically and attain competency at performing psychomotor skills. Students should be assessed in various ways throughout their nursing education for attainment of critical thinking and psychomotor skills.

Recommendations. Recommendations for future research include replication of the study using a different sample and an investigation of methods utilized in teaching critical thinking skills in nursing education.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Overview of the Problem

Nursing care requires a complex combination of skills including critical thinking and psychomotor abilities. New Registered Nurse (RN) graduates are expected to possess critical thinking skills as well as basic competency skills as they enter the nursing work force. Nurse educators are being challenged to incorporate critical thinking activities into the curriculum to enhance students' skills in the thinking process as well as the actual performance of psychomotor and cognitive skills related to client care.

Orem (1991) described specialized abilities nurses must possess that enable them to care for their clients. Orem stated that the level of ability a nurse possesses varies, in part, according to educational preparation. It is a joint responsibility between nursing students and nursing educators for the student to obtain opportunities and direction in the development of abilities that allow the new graduate to function as an entry level RN. Two of these

specialized nursing abilities that are discussed in this study are critical thinking and psychomotor skill abilities.

Purpose of the Study

The purpose of this study was to determine if significant relationships existed among critical thinking and psychomotor skills and selected experiential, demographic, and educational variables in first semester diploma nursing students.

Research Hypothesis

The research hypotheses were: 1) There will be a significant correlation between ability to think critically and ability to perform selected psychomotor skills; 2) There will be a significant difference in critical thinking between those with previous experience and those with no previous experience in a nursing related position; 3) There will be a significant correlation between ability to think critically and age; 4) There will be a significant correlation between ability to think critically and gender; 5) There will be a significant correlation between ability to think critically and high school grade point average (GPA) or GPA of previous higher

education; and 6) There will be a significant correlation between ability to think critically and the number and types of courses taken in post secondary education.

Definition of Terms

The definition of key terms used in this study were as follows.

Critical thinking was defined as "a composite of attitudes, knowledge, and skills. This composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge" (Watson and Glaser, 1980, p. 1). Critical thinking was measured using the Watson-Glaser Critical Thinking Appraisal (WGCTA).

Psychomotor skills were defined as movement-oriented proficiencies combining both a motor and cognitive component. The psychomotor skills that were

measured included handwashing, meal service, body mechanics, bedmaking and bedbath. The students performed these skills during the first semester of their freshman year. Psychomotor skills were measured using the Critical Skill Performance Checklist (CSPC) (Appendix A).

Experience in a nursing related position was defined as experience in a nursing setting, as a Licensed Practical Nurse (LPN) or Nursing Assistant, obtained prior to admission into the Diploma Nursing Program.

Age of the students was actual age on last birthday. Age of the student was obtained from self reported data on the answer sheet used for the WGCTA.

GPA was defined as the grade point average the student accrued while in a previous educational setting. This included high school or college level courses.

Post secondary education was defined as the number of post secondary educational courses completed in behavioral or natural sciences, or in the humanities.

Assumptions

Assumptions of this study were as follows:

1. The development of critical thinking skills is essential in nursing.
2. Critical thinking can be taught.
3. Nursing educators believe they have a responsibility to include methods in the nursing curriculum that stimulate critical thinking skills.
4. Students desire to do well on psychomotor skills.
5. Students view critical thinking abilities and psychomotor abilities as essential skills for an RN to develop.
6. There exists a clear distinction between measurement of psychomotor skills and critical thinking ability.

Significance of Study to Nursing

There are sparse data available in the literature in the area of correlations between critical thinking and psychomotor skills. There are also sparse data in the area of critical thinking abilities in diploma nursing students. This study added information to the body of nursing knowledge in these areas.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this study was to determine if significant relationships existed among critical thinking and psychomotor skills and selected experiential, demographic, and educational variables in first semester diploma nursing students.

In this chapter, the theoretical basis for the study and a review of the current literature is presented. The first section addresses the conceptual framework that formed the basis for the study. A review of the relevant literature follows. Included in this section is a discussion of critical thinking and psychomotor theories. Previous studies regarding these concepts are discussed.

Conceptual Framework

The basis for this study was derived from Orem's (1991) theory of nurse agency. Orem described nursing agency as "a complex set of qualities of a person acquired through specialized study and experiences in real-world nursing situations" (p.254). She described the general characteristics of nursing agency as "nursing abilities and limitations as related to ...

types of assistance adjusted to conditions prevailing in some types of nursing situations. The characteristics of nursing agency at a specific time are the result of certain enabling and limiting factors related to a nurse's age and maturity, degree of development and perfection of the nursing art, structured nursing knowledge, state of health, and the environmental conditions under which the nurse exercises nursing agency" (p. 254).

Orem (1991) discussed desirable nurse characteristics as being composed of social, interpersonal, and technological aspects. She described the nurse as possessing "nursing prudence" (p. 256), or that quality that enables the nurse to seek advice in new or different situations, make correct judgements, make decisions to act in a particular way and to take action based upon these decisions. Orem was of the belief that the art of nursing and nursing prudence, develop with experience. "The degree to which and the manner in which they develop in individual nurses are associated with nurses' talents, personality characteristics, developed and preferred modes of thinking, stages of personal

moral development, abilities to conceptualize complex situations of action and to analyze and synthesize factual information, and the kinds of life experiences they have had, including nursing experiences" (p. 257).

Orem (1991) stated that broad components of professional education are comprised of preprofessional and professional program components. She described the preprofessional components as course sequences in the liberal arts and humanities and basic sciences or disciplines of knowledge necessary for understanding the courses of the professional component and for doing the prescribed work in them. The professional component was described as foundational courses in the disciplines of knowledge essential for understanding courses in the professional field, courses in the professional field, and continuing education courses (p. 336). Orem is of the belief that it is essential in the development of programs of professional education for nursing practice to understand the fields and areas of knowledge of the practical science of nursing in order to provide rationale for the selection of the foundational courses of the program (p. 336). She also stated, "Knowledge of the human sciences is

essential for nursing practice when properly articulated with nursing facts and points of theory" (p. 5).

Critical Thinking Theory

Watson and Glaser (1980) are of the belief that there are many definitions of critical thinking and composites of abilities that constitute critical thinking. They proposed however, that there would be overlap in the lists of abilities that constitute critical thinking and the lists would correlate highly. Watson and Glaser cite Dressel and Mayhew's (1954) five abilities that appear to be related to the concept of critical thinking. Dressel and Mayhew (1954) reported these five as ability to: define a problem; select pertinent information for the solution of a problem; recognize stated and unstated assumptions; formulate and select relevant and promising hypotheses; and to draw valid conclusions and judge the validity of inferences.

Paul (1992) stated that critical thinking is not just thinking, but thinking that involves self-improvement. He proposed that "this improvement comes from skill in using standards by which one

appropriately assesses thinking" (p. 7). McPeck (1981) described the uniqueness of critical thinking as a process of interaction between individuals and the interpretations of knowledge that are created. Critical thinking theory emphasizes the importance of independent, higher level thinking where learning occurs as a result of the process itself, as opposed to accepting another's conclusions (Paul, 1984).

As opposed to the linear problem solving model where logical data are mounted to surmise an answer that is concrete with right and wrong outcomes, critical thinking has been described as a type of systems model with the sums being more than its parts. Its parts include activities such as reflective skepticism, exploring and imagining alternatives and expanding one's thinking process to include situation contexts (McPeck, 1981). Paul (1984) asserted that the context of the situation helps to determine acceptable solutions to the problem. Critical thinking includes a process-oriented rather than a product-oriented process (Jones and Brown, 1991).

Previous Studies Measuring Critical Thinking

Previous studies that have measured critical thinking ability have included the four basic RN programs as subjects (baccalaureate, associate, diploma, and baccalaureate completion) as well as graduate programs and licensed practical nursing programs. There are conflicting findings on whether critical thinking occurs over time in the various nursing programs.

In three studies conducted, no significant gain of critical thinking ability was found. Bauwens & Gerhardt (1987) studied 53 baccalaureate students as they entered and exited upper division study (defined in the study as the last five semesters of the nursing program). They reported that no significant gain in critical thinking ability occurred as determined by the WGCTA. Neither the results of the t-test nor the level of significance was reported, however.

Kintgen-Andrews (1988) administered the WGCTA to 55 practical nursing students, 55 two-year associate degree nursing students, and 29 generic university nursing program sophomores at the beginning and end of an academic year. Kintgen-Andrews reported no

significant gain in students' scores in any of the programs over the academic year.

Sullivan (1987) measured critical thinking ability of 46 students at the start and completion of an RN baccalaureate completion program. There was no significant gain in critical thinking ability found at the completion of the program ($t = .10$, $p < .918$).

Other studies support the gain of critical thinking ability over time. Berger (1984) administered the WGCTA to 137 baccalaureate sophomore students and again tested them as seniors. She reported significant gains in critical thinking scores over the time period ($t = 3.98$). No level of significance was given.

Gross, Takazawa, and Rose (1987) studied 37 associate degree students and 34 baccalaureate upper division students as they entered and exited their respective program. Significant gains in critical thinking as determined by the WGCTA were reported (associate degree, paired $t = 5.96$, $p < .000$ and baccalaureate students, paired $t = 6.83$, $p < .000$).

In cross-sectional studies, data support an increase in critical thinking skills in relation to nursing education. Frederickson and Mayer (1977)

administered a critical thinking test that they described as a "standard critical thinking test", to 28 baccalaureate and 27 associate degree nursing students. They found that baccalaureate degree students scored significantly higher on the test at the .01 level (specific statistic was not reported).

Scoloveno (1981) administered the WGCTA to 93 second year associate degree, 97 third-year hospital diploma, and 90 senior baccalaureate nursing students. Baccalaureate students scored significantly higher on the WGCTA than diploma students at the $p < .01$ level (no specific statistic was reported).

Pardue (1987) administered the WGCTA to 27 associate degree, 24 hospital diploma, 33 baccalaureate, and 37 master's prepared RN's. She reported a significant difference in critical thinking ability among associate degree, diploma, baccalaureate, and master's prepared nurses ($F = 7.20$, $p = .001$). The Scheffe post hoc comparison test revealed that baccalaureate and master's degree nurses did have significantly higher critical thinking scores than associate degree or diploma nurses.

Gender and critical thinking have been studied.

Berger (1984) indicated there was no significant difference in ability to think critically, as measured by the WGCTA, between males and females. Berger found the mean critical thinking score for males was 75 compared to 77 for females.

Age and critical thinking have been studied (Gross, Takazawa, & Rose, 1987). Administering the WGCTA to students from associate and baccalaureate at admission to the programs ($n = 97$) and at graduation ($n = 72$) from the programs, they reported no significant difference between age and ability to think critically at admission ($r = .01$, $p < .05$) or at graduation ($r = .18$, $p < .05$).

Conflicting data exist regarding courses in which a student shows competency and the student's critical thinking ability. Using WGCTA scores of 137 baccalaureate nursing students, Berger (1984) determined there was no significant relationship between WGCTA scores and grade point average in nursing courses ($r = .139$) or between WGCTA scores and grade point averages in science courses ($r = .219$). There was a significant positive correlation between the GPA's of students who performed well in the area of

science and the GPA's of those students who did well in nursing ($r = .357$). No level of significance was reported for these results. In the same study, Berger also indicated that senior level baccalaureate nursing students had higher critical thinking abilities than senior level liberal arts students ($t = 3.98$). No level of significance was reported.

Tiessen (1987) correlated WGCTA scores with the GPA's of 150 baccalaureate nursing students at various levels in the program. There was a significant correlation reported between students' ability to think critically and their GPA ($r = .32$, $p < .05$). Tiessen also correlated WGCTA scores with previous credits in the natural sciences, behavioral/social sciences, and arts and humanities. Significant relationships existed between critical thinking and the total number of credit hours in arts and humanities ($r = .30$, $p < .01$). There was no significant correlation reported between critical thinking and the total hours of credit in the natural sciences.

Teaching Critical Thinking

Paul (1992) stated that critical thinking is a

disciplined, self-directed activity. To teach critical thinking teachers should create opportunities and incentives for students to think (Paul, 1991). This may require decreasing some of the amount of subject matter, and restructuring the curriculum to focus on basic concepts, understandings, and abilities.

Bandman and Bandman (1988) describe nursing as being in a state of change. They are of the belief that "critical thinking offers methods to transform students into active participants in their own intellectual growth" (p. 2). They believe that the time is right in nursing "in which to use canons of critical thinking and logic to inquire openly into the assumptions, beliefs, goals, and values that characterize nursing" (p. 2). Bandman and Bandman describe the role of critical thinking in nursing as "sharpening the distinctions between certainty, near certainty, and degrees of uncertainty (p. 6).

Glatthorn (1987) discussed four research-supported principles for teaching critical thinking: 1) it should be systematic; 2) it should be direct; 3) it should be integrated with standard subject matter; and 4) instruction should be developmental, leading to

formal thought. It was proposed that these principles should be implemented in a variety of creative ways to promote critical thinking.

Klaassens (1988) stated that teaching nursing students critical thinking skills is essential to help them effectively solve problems. Klaasens emphasized the importance of creating a curriculum with teaching style methods that could be individualized to the student's learning style.

Teaching Psychomotor Skills

Field, Gallman, Micholson, & Dreher (1984) described psychomotor skills as "skills using a knowledge base to implement a procedure in a manner that indicates progress in mastery of the performance". Nursing Arts Laboratories are one type of setting used in nursing programs to provide a source for students to practice and learn specified skills as well as "bridge the gap between the classroom and the clinical setting, thereby improving client care and reducing the students' anxiety" (Taylor & Cleveland, 1984, p. 32). The use of a nursing arts laboratory as a means of teaching psychomotor skills has also been reported as

resulting in improved clinical skills and a more satisfying experience for students (Haukenes & Halloran, 1984).

Gomez and Gomez (1987) describe the clinical laboratory as a "stable and stationary environment" (p.20) for teaching "closed" psychomotor skills. They define closed psychomotor skills as skills that can be manipulated and controlled such as making an unoccupied bed or moving about in a sterile field.

Students possess a variety of learning style preferences. Nursing educators recognize the need to use a variety of methods to teach psychomotor skills. An assortment of methods have been documented to teach psychomotor skills including simulation (Hodson, Brigham, Hanson, & Armstrong, 1988; Cowan & Weins, 1986; Infante, 1985), learning on the clinical unit (Gomez & Gomez, 1987), structured experience (Dahl, 1984), CAI (Reynold & Pontious, 1986), self-directed learning versus structured tutor-directed learning (Love, McAdams, Patton, Rankin, & Roberts, 1989), and self - directed versus scheduled labs (Taylor & Cleveland, 1984). Other methods include preceptorship, bibliographies, audiovisual aids, and selected syllabi

(Love, et al, 1989).

Summary of Literature Review

The literature review revealed that the WGCTA is a frequently used tool to assess critical thinking abilities. Critical thinking and GPA of specific areas of study have been correlated positively. There is a discrepancy over whether critical thinking ability increases over time. This researcher found no studies to support that a difference existed between critical thinking and gender, nor significant correlation between critical thinking and age.

Psychomotor skill development has been described in the literature as an essential component of nursing capabilities. This researcher was unable to find studies that correlated critical thinking ability to psychomotor skill attainment. Therefore, this study was indicated to increase knowledge in that area.

CHAPTER 3

METHODOLOGY

The purpose of this study was to determine if significant relationships existed among critical thinking and psychomotor skills and selected experiential, demographic, and educational variables in first semester diploma nursing students.

In this chapter, the research design, subjects and sampling method, description of data-collection tools and data-gathering procedures are described.

Research Design

A correlational design was used to conduct this study. Polit and Hungler (1991) defined correlational research as an index of the extent to which two variables are interrelated. The correlation between critical thinking and the selected correlates of psychomotor skills, age, gender, previous education, previous experience, and GPA were studied. Therefore, this design was appropriate.

Subjects and Sampling Method

Subjects were in their first semester of a five

semester nursing program. The setting for the study was a medium-sized diploma nursing program in the Midwest. Graduates of the program are granted a Diploma in Nursing.

The nursing class that the sample was taken from was composed of 132 students. One hundred and five students agreed to participate in the study. Eight of these students' scores were not used in the study as they did not complete the WGCTA. The data producing sample, therefore, consisted of 97 subjects. Characteristics of the data producing sample are depicted on Table 1, p. 22.

The sample consisted primarily of female students. The ratio of male to female subjects was similar to the ratio of male to female students in the first semester course. Most subjects were in the age range of 18 to 25. Previous experience in nursing was determined as experience as a Nursing Assistant. Since Licensed Practical Nurses (LPN) enroll in this nursing program as second semester students, there were none in the sample. Post secondary education courses included courses in behavioral sciences, natural sciences, and humanities. The range of the number of

Table 1
Characteristics of Sample

Gender	n	%
Males	8	8
Females	89	92
Age Groups		
18-25	51	53
26-30	15	15
31-35	19	20
36-40	7	7
Over 40	5	5
Certified Nursing Assistant	25	26
Students With Post Secondary Education		
Behavioral Sciences	87	90
Natural Sciences	60	62
Humanities	81	84

courses taken in the behavioral sciences was 0 - 16 courses.

Additional characteristics not depicted in Table 1 are the types and numbers of post secondary courses obtained, and high school and post secondary GPA. The range of the number of courses taken in the natural sciences was 0 - 9. The range of the number of courses taken in the humanities was 0 - 41.

The mean high school GPA was 2.716 and ranged from 1.54 - 3.97. The mean college GPA of the subjects was

3.016 and ranged from 1.93 - 4.00. The range of high school GPA's of the subjects were slightly lower than the college GPA's. Six students received a GED; no high school GPA was reported. Nineteen students either did not report a high school GPA or it was calculated on a scale that could not be used for the study. Six college GPA's were not recorded although partial transcripts were available for these students.

The demographic data of the sample were similar to demographic data of the student body of the program.

Description of Data-Collection Tools

Two data collection tools, The Watson Glaser Critical Thinking Appraisal (WGCTA) and the Critical Skill Performance Checklist (CSPC), were used in the study. Each is described.

The WGCTA Tool

The Watson Glaser Critical Thinking Appraisal (WGCTA) consists of 80 questions and tests the five areas of inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. The questions are evenly distributed among the five

areas with 16 questions in each area. A score from 0 to 80 is possible.

The two most current forms of the WGCTA are Forms A and B. They have equal numbers of questions and test the same five areas. Although the WGCTA is not recommended as a timed test, the WGCTA Manual (Watson & Glaser, 1980), stated that most students using Form A or B complete the test in approximately 40 minutes. Questions proposed on the test are similar to situations encountered in every day life. They are intended to elicit responses of both neutral and strong beliefs of the individual.

Watson and Glaser (1980) stated that the reliability of the WGCTA was assessed in several ways. Internal consistency was measured by calculating split-half reliability coefficients. The split-half reliability coefficients ranged from 0.69 to 0.85. The stability of test scores over time was assessed by administering the test twice to a group of 96 college students with an interval of three months between testing periods. The reported means and standard deviations obtained were almost identical for the first testing period and the second testing period. The

correlation between responses at the two time periods was reported at .73. Watson and Glaser stated that alternate-form reliability was calculated by correlating responses of subjects on two forms of the WGCTA. On a group of 228 twelfth grade students, the correlation of responses to Form A and Form B of the test was reported at .75. Watson and Glaser also reported the means and standard deviations obtained were equivalent for Form A and Form B.

Validity for the WGCTA was examined in a number of different settings using both forms, as well as earlier Forms Ym and Zm (Watson and Glaser, 1980). Validity was determined initially through construct and content analysis. These processes were not described. Norms for students of various college levels and programs are provided with the manual as well as norms for various professions and occupations. Comparative scores are available in the manual for nursing students in baccalaureate programs in various geographic locations of the United States.

The CSPC Tool

The Critical Skill Performance Checklist (CSPC)

(Appendix A) measures psychomotor ability of nine nursing skills. Criteria from six of the skills were used for the study. These were handwashing, bedbath, occupied bed, unoccupied bed, meal service, and body mechanics. The criteria describe essential functions to complete each skill. Criteria on the checklist for each skill were taken directly from assigned readings. The number of criteria for each skill was: handwashing (14); meal service (13); nurse body mechanics (10); unoccupied bed (28); bedbath (40); and occupied bed (32). There were a total of 137 criteria for the six skills with a range from 0 to 137 possible.

Faculty at the diploma nursing school where the study was conducted concurred that the CSPC has face and content validity. Criteria for the checklist was derived directly from assigned readings. Faculty members determined inter-rater reliability. Prior to scheduled laboratory sessions, instructors set up mock situations and performed skills as designated on the checklist. Each instructor completed the area on the CSPC that included criteria for that specific skill. Faculty compared scores. The skill was repeated with instructors rating the skill until faculty scored

within one point of each other on the checklist. No specific data were retained on faculty scores.

Description of Data-Gathering Procedures

Before the study was conducted, information was presented to the freshman students during a regularly scheduled class period two weeks into their first semester of the program. The purpose and benefits of the study were explained. Students were invited to participate in the study by signing a consent form (Appendix B). The form indicated that there were no additional time, work, or cost requirements to participate in the study and that all data to be used for the study would be collected from previously required tests and file information. If the students wanted feedback after the study, they were invited to check the appropriate area on the consent form to receive an abstract of the study.

During the first two weeks of the program, the WGCTA was administered during a regularly scheduled laboratory period. The test was administered to all students regardless of whether they chose to participate in the study or not participate in the

study. Standardized instructions were given in regard to completing a computerized answer sheet. Students were asked to write their age in the date of birth space on the answer sheet. Students were given an opportunity to ask questions before the test. One hour was given to complete the test. All students completed the test before one hour elapsed.

Students were evaluated by instructors on their performance of six psychomotor skills using criteria found on the CSPC. The evaluations took place during the first eight weeks of the school year. At the beginning of the semester, students were given criteria for each of the six skills on which they would be evaluated. The criteria were identical to the criteria found on the CSPC used by instructors.

Laboratory periods were conducted and CSPC completed using the following method. Before each scheduled laboratory session, students were assigned to read about a specific skill. Each student was required to attend a two hour laboratory session each week to receive additional information regarding the skill, view a demonstration of the skill, and complete a return demonstration of the skill. Students were given

the opportunity to practice the skill or complete a return demonstration to laboratory instructors during laboratory sessions. Some students chose to perform the skills immediately, others chose to practice first. Students were evaluated by the instructors using the CSPC. Criteria for each skill on the CSPC are found in Appendix A.

Completion of the return demonstration and evaluation of criteria for that skill as indicated on the CSPC were as follows. Students would indicate to an available laboratory instructor that they were ready to perform the return demonstration. The student would proceed to demonstrate the skill. If a particular step was forgotten or not completed correctly, the student would be given the opportunity to correct the error. If the student was not able to correct the error, an unsatisfactory mark would be entered for that skill on the CSPC by the instructor.

Data regarding students' GPA, previous experience in a nursing related field, and post secondary education information were gathered from the files of students who signed a consent form to be included in the study. The researcher who conducted this study

obtained all data from the files.

Protection of Subject's Rights

Permission to conduct the study was obtained from the Human Subjects Review Committee at Drake University and from the director of the diploma nursing program where the study was conducted.

The purpose of the study was explained to the students prior to data collection. Students were asked to sign a form that indicated their consent to participate in the study (Appendix B). The form clearly indicated that participation in the study was optional and that agreement to participate in the study or not to participate in the study would have no effect on grades.

CHAPTER 4

FINDINGS

The purpose of this study was to determine if a significant relationship existed among critical thinking skills and psychomotor skills and selected experiential, demographic, and educational variables in first semester diploma nursing students. The Business MYSTAT computer program was used for analysis. An alpha level of 0.05 was established.

The WGCTA scores ranged from 29 to 77 with a mean of 54.979. The CSPC scores ranged from 112 to 137 with a mean of 130.052.

Hypothesis Testing

Hypothesis one stated: There will be a significant correlation between ability to think critically and ability to perform selected psychomotor skills. Findings related to this hypothesis are presented in Table 2, p. 32. The Pearson correlation ($r = 0.194$) was not significant. The hypothesis was not supported.

Hypothesis two stated: There will be a significant difference in critical thinking between

Table 2
RELATIONSHIP BETWEEN CRITICAL THINKING AND PSYCHOMOTOR SKILLS

	Mean Score	r
WGCTA Score	54.979	
		0.194
CSPC Score	130.052	

those with previous experience and those with no previous experience in a nursing related position. Findings related to this hypothesis are presented in Table 3.

Table 3
DIFFERENCES IN ABILITY TO THINK CRITICALLY BASED ON PREVIOUS EXPERIENCE IN A NURSING RELATED FIELD

	Mean WGCTA Score	t	df	p
Previous experience	52.88			
		1.283	95	.203
No Experience	55.708			

The independent t-test ($t = 1.283$, $df = 95$, $p = 0.203$) was not significant. The hypothesis was not supported.

Hypothesis three stated: There will be a significant correlation between ability to think critically and age. Findings related to this hypothesis are presented in Table 4, p. 33. The Pearson correlation ($r = 0.364$, $p < 0.05$) was significant. The

hypothesis was supported.

Hypothesis four stated: There will be a significant difference between ability to think

Table 4
RELATIONSHIP BETWEEN CRITICAL THINKING AND AGE

	Mean	r
WGCTA Score	54.979	
		0.364*
Age	26.856	

* $p < 0.05$

critically and gender. The mean scores on the WGCTA for males was 58.778 and for females 54.591, a difference of 4.187. Findings related to this hypothesis are presented in Table 5.

Table 5
DIFFERENCE IN ABILITY TO THINK CRITICALLY AND GENDER

	Mean WGCTA Score	t	df	p
Male	58.778			
		1.260	95	0.211
Female	54.591			

The independent t-test ($t = 1.260$, $df = 95$, $p = 0.211$) was not significant. The hypothesis was not supported.

Hypothesis five stated: There will be a significant correlation between ability to think critically and high school GPA or GPA of previous

higher education. Findings related to this hypothesis are presented in Table 6.

Table 6
RELATIONSHIP BETWEEN CRITICAL THINKING AND GPA

	Mean	r
High school GPA	2.716	0.014
Higher Education GPA	3.016	0.144

The Pearson correlations indicated that there was no significant relationship between ability to think critically and high school GPA ($r = 0.014$) and between ability to think critically and higher education GPA ($r = 0.144$). The hypothesis was not supported.

Hypothesis six stated: There will be a significant correlation between ability to think critically and the number and types of courses taken in post secondary education. Findings related to this hypothesis are presented in Table 7.

Table 7
CORRELATION BETWEEN WGCTA SCORES AND PREVIOUS NUMBER OF COURSES COMPLETED

	r
Total Previous Courses	0.259*
Behavioral Sciences	0.288*
Natural Sciences	0.135
Humanities	0.188

* $p < 0.05$

Significant Pearson correlations between ability to think critically and the total number of previous courses taken in post secondary education ($r = 0.259$, $p < 0.05$) and between ability to think critically and the number of post secondary courses taken in behavioral sciences ($r = 0.288$, $p < 0.05$) were found. No significant correlation was found between ability to think critically and natural sciences ($r = 0.135$) or ability to think critically and humanities ($r = 0.188$). The hypothesis was partially supported.

Additional Findings

Further analyses were calculated to determine if a significant relationship existed between CSPC scores and prior post secondary courses taken. No significant relationships in CSPC scores and the total number of courses completed, CSPC scores and behavioral science courses completed, CSPC scores and natural science courses completed, or CSPC scores and humanity courses completed were found (See Appendix C, Table C-1).

Additional analysis was completed to determine if a significant relationship existed between CSPC scores and age. Findings related to this correlation can be

found in Table 8.

Table 8
RELATIONSHIP BETWEEN CSPC SCORES AND AGE

	Mean	r
CSPC Score	130.052	
		0.280*
Age	26.856	

* $p < 0.05$

The Pearson correlation ($r = 2.80$, $p < 0.05$) revealed a significant relationship did exist between CSPC scores and age.

In addition, no significant relationships were found between CSPC scores and high school GPA or between CSPC scores and GPA from post secondary education (See Appendix C, Table C-2). No significant relationship was found between age and the total number of courses previously taken, or between age and the number of courses taken in the natural sciences or humanity courses (See Appendix C, Table 3). However, a significant relationship existed between age and the number of behavioral science courses taken in post secondary education ($r = 0.237$). No significant difference was found between students who had previous experience as nursing assistants compared to those who

did not have previous experience ($t = 0.977$, $df = 95$, $p = 0.331$). Results indicated a significant negative relationship existed between age and high school GPA ($r = -0.266$, $p < 0.05$). No relationship was indicated between age and GPA from post secondary education (See Appendix C, Table C-4). No significant difference was found between scores on the CSPC for males and females ($t = 0.705$, $df = 95$, $p = 0.482$).

CHAPTER 5

DISCUSSION

The purpose of this study was to determine if a significant relationship existed among critical thinking and psychomotor skills and selected experiential, demographic and educational variables in first semester diploma nursing students. In this chapter findings are related to the conceptual basis of the study, discussion of findings are presented, limitations of the study are identified, and recommendations for future research are suggested. The chapter concludes with a summary of the study.

Relationship of Findings to Conceptual Framework

Orem (1991) described characteristics of nurse agency that were desirable qualities for a nurse to possess. She stated that these qualities were composed of social, interpersonal and technological skills. Although Orem did not mention critical thinking specifically as a quality of nurse agency, she did describe nursing prudence as a desirable quality - an art that would require critical thinking ability. She described nursing prudence as seeking advice in

situations and making correct judgements and decisions based on the information. These constructs of nursing prudence are evident in the concept of critical thinking.

Orem (1991) asserted that characteristics of nurse agency at a specific time are the result of certain enabling and limiting factors related to a nurse's age and maturity, degree of development and perfection of the nursing art, structured knowledge, state of health and environmental conditions. A significant correlation was found between age and score on the Critical Skills Performance Checklist that was used to measure specific psychomotor skills. Perhaps age is an enabling factor for the development of psychomotor skills. Perhaps as people age and mature they are exposed to a variety of technological skills. It is possible that with repeated exposure to technological skills the ability to perform psychomotor skills improves. The subjects were in their first eight weeks of the hospital diploma program. They had been taught specific skills but had not yet had an opportunity to relate them to nursing theory or use the skills in a patient setting. Perhaps technological skill

development can be viewed as a function of the lived experience. Students enroll in a nursing program possessing a certain degree of technological skill development that may be attributed to age and the lived experience. Perhaps it is through the specialized study and experiences in real-world nursing situations that these characteristics actually develop into qualities of nurse agency.

Orem (1992) asserted that the degree and manner that nurse prudence and the art of nursing develop are associated with nurses' talents, personality characteristics, modes of thinking, stages of development, ability to conceptualize situations and analyze information, as well as the lived experience and nursing experiences. A significant correlation was not found between ability to think critically and ability to perform psychomotor skills. The subjects did not have experience in "real-world" nursing situations. They had not participated in specialized nursing study that could have helped prepare them to conceptualize situations and analyze information. The subjects' mode of thinking was perhaps more structured and focused towards following step by step instructions

rather than thinking through the process critically. Nurse agency is beginning to be developed at this point in time.

Orem (1991) described components of nursing education as being preprofessional and professional. She asserted that there are sequences of study in the liberal arts and humanities and basic sciences or disciplines of knowledge that are necessary for understanding the professional component of nursing and for doing the prescribed work in them. Specific preprofessional sequences in the liberal arts, humanities and basic sciences are not a requirement of this hospital diploma program. The subjects were required to take some preprofessional courses in the program including courses in anatomy, physiology, microbiology, sociology and psychology. Ninety-two percent of the subjects, however had completed courses in the behavioral or natural sciences or humanities. Ninety percent of the subjects had completed previous courses in behavioral sciences, 62 percent had completed courses in natural sciences and 84 percent in the humanities. Eight percent of the subjects had not completed any post secondary courses. Ability to think

critically and courses completed in the behavioral sciences were significantly correlated. Ability to think critically and the total number of courses completed in the basic and natural sciences and humanities were also significantly correlated. These findings are congruent with Orem's propositions. Although the subjects had not completed a specific sequence of courses in these areas, perhaps exposure to the content through a variety of courses in the sciences and humanities had an enabling effect to positively influence subjects' ability to think critically. Perhaps if students were encouraged to complete courses or sequences of courses in the areas of the basic and natural sciences and humanities before enrolling in a hospital diploma program the development of qualities of nurse agency may be enhanced.

Discussion of Findings

It was hypothesized that there would be a significant correlation between ability to think critically and ability to perform selected psychomotor skills. A significant correlation was not found. Perhaps the ability to think critically in a given

situation develops along with the psychomotor skill itself. While a student is beginning to learn a skill, the concentration level is focused on the steps of the procedure itself. The possibility exists that if a psychomotor performance test were used, it would be implemented after the skill had been mastered. This may indicate a significant correlation between the student's ability to think critically and ability to perform psychomotor skills.

It was also hypothesized that there would be a significant difference in critical thinking between those with previous experience and those with no previous experience as a nursing assistant. This was not supported. A possible reason for this finding is the role expectation of a nursing assistant. In health care settings, the role may be directed more towards following instructions than thinking independently and making personal judgement calls.

A significant correlation between ability to think critically and age was found. This finding is congruent with those of Tiessen's (1987) who also found a significant correlation between ability to think critically and age. Perhaps this is understandable

because the lived experience itself inside or outside a post secondary educational institution may support an increase in critical thinking skills.

Findings in this study did not support the hypothesis that there would be a difference between ability to think critically and gender. These findings are congruent with those of Berger (1984) who reported no significant difference in scores on the WGCTA between males and females. Perhaps this is understandable because males and females in the samples would probably have been required to take similar courses as prerequisites to the nursing program. The possibility exists that in different samples of males and females who are enrolled in diverse areas of study, the results would show a significant difference.

A significant correlation between ability to think critically and high school GPA and post secondary education GPA was not found. Perhaps the sample was unique because several of the students had either no high school GPA recorded (had not graduated from high school, but received a GED), no post high school GPA, or their high school GPA was not used in the study because it was calculated on a unique scale. In a

different sample of students which the GPA is known for all students, the results may have revealed a significant correlation.

The findings in this study are consistent with those of Tiessen (1987) who reported a positive correlation between scores on the WGCTA and selected types of courses taken. Similar to Tiessen, this study revealed a significant correlation between behavioral science courses completed and WGCTA scores. No significant correlation was found between WGCTA scores and natural science courses completed. Unlike Tiessen's study, however, findings in this study did not support a significant correlation between courses completed in the humanities and scores on the WGCTA. The possibility exists that courses in the behavioral sciences encourage more practice with critical thinking than the more concrete natural science courses. Courses in behavioral sciences require a high degree of abstractness and creativity as they deal with complex and unique individuals.

Additional statistical results revealed that there was a significant correlation between age and scores on the CSPC. Perhaps students who are older have

developed a method of learning that allows them to learn a skill more quickly or more easily than their younger classmates. Although it was not documented which students chose to practice longer or practice during open laboratory times in addition to the scheduled laboratory times, perhaps the older students chose to practice more. It could be that the older students were more motivated than their younger peers.

Limitations of Study

Several limitations of the study were evident. The CSPC form was a new form being used by the institution. Although inter-rater reliability was determined by faculty who used the tool, additional validity and reliability testing would have been useful.

The number of times the students practiced the skill itself could have had an impact on the results of the CSPC scores. Students were allowed to practice as often as they desired. Some students chose to practice more than other students. Perhaps the amount of practice influenced the scores on the CSPC. If everyone had been required to practice a certain amount of time, perhaps scores on the CSPC would have been

different.

Another limitation may have been a result of the data collection method from student files. Not all student files were complete. Some students had partial or no data in their files on high school GPA. Several students' high school transcripts were from schools whose method of calculating GPA's were different than the usual four point system. These GPA results were excluded from the study. These factors may have caused skewing of results on high school GPA. If only those students who had all the required data in their files were included in the study, the results may have been different.

Implications for Nursing

The results of this study have significant implications for the education of diploma nursing students. While a significant relationship was not found between critical thinking ability and ability to perform psychomotor skills, statistical analysis revealed other factors that did significantly relate to critical thinking ability. The total number of post secondary courses, and specifically those in the

behavioral sciences, have a significant impact on ability to think critically. Since critical thinking is such a vital characteristic for nurses to possess, students who are interested in diploma nursing education should be encouraged by high school and college counselors to obtain credits in required courses before being admitted to diploma nursing programs. Perhaps in the future, students will be required to complete liberal arts courses before being admitted to nursing programs.

Orem (1991) stated that nurses perform specialized functions at varying levels of competence and expertise. She also stated that the process is influenced by personalities and life situations. Students will learn at different rates and require varying degrees of practice before they are able to master a skill. These principles should be incorporated into the laboratory setting to create an atmosphere that is conducive to learning.

Nurse educators and students have a shared responsibility to obtain skills that Orem (1991) described as "desirable nurse characteristics" (p. 261). Diploma nurse educators should therefore

focus on individual learning styles and needs to develop these characteristics. They must be prepared to provide focus and direction to students' efforts to achieve competence in the areas of becoming socially, interpersonally, and technically aware. To become competent in these areas, students must be aware of their own capabilities in the areas of critical thinking and psychomotor skills. Nurse educators can help accomplish this through testing, such as the WGCTA, and psychomotor skill tools similar to the CSPC.

The negative correlation found between high school GPA and age has implication for the education of diploma nursing students. High school GPA is a standard entrance requirement for most secondary educational programs. Perhaps this factor should be emphasized less and other factors weighed more heavily with students who are nontraditional students. Since there was a negative correlation between high school GPA and age, after a given period of time (for example, five years), high school GPA should not be used as an entrance indicator. There are more accurate indicators of a student's abilities such as critical thinking abilities and the number of behavioral science courses

completed. The previous total number of courses should be considered as well as GPA of post secondary courses. This study also indicated that there was a significant relationship between courses taken in the behavioral sciences and critical thinking ability. The number of courses and the GPA of courses in the behavioral sciences should be considered for entrance criteria into a diploma nursing program.

Results of this study indicate that the area of behavioral sciences was significantly related to ability to think critically. There may be some courses such as sociology and psychology that enhance the ability to think critically more than other courses such as physics or chemistry. To make use of this significance, the applicants' records from previous higher education courses could be viewed more closely by the admission committee than has been done in the past for courses completed in the behavioral sciences.

These findings have implications for how psychomotor skills are taught and measured. The results indicated that scores from the WGCTA and the CSPC were not significantly related. Ability to think critically is an essential characteristic for a nurse.

Most staff nurses perform a number of psychomotor skills daily. A component of critical thinking could be added to every psychomotor skill that is taught. For example, case scenarios or computer assisted instructions could be incorporated into the nursing arts laboratory to measure a component of cognitive skills as well as evaluation of psychomotor skills. Nursing educators should be more concerned with integrating critical thinking skills into every part of the curriculum, including the nursing laboratory.

Recommendations for Future Research

Recommendations for further study include the following:

1. A replication of this study with a different diploma nursing program;

2. A replication of this study after the CSPC has been utilized more than one time or revisions have been made;

3. A replication of this study using more difficult psychomotor skills;

4. A replication of this study using a different tool such as the California Critical Thinking Skills

Inventory.

5. An investigation of methods utilized in nursing education which enhance the students' abilities to think critically.

Summary

Relationships among critical thinking and psychomotor skills and selected experiential, demographic, and educational variables in 97 first semester diploma nursing students were examined. Students completed the WGCTA and nursing instructors observed students performing psychomotor skills to complete a section on the CSPC that measured criteria for that particular skill. Data from the students' previous work experience, age, gender, high school GPA and GPA from post high school courses, and previous courses taken in higher education were obtained from students' files. There were significant relationships found between: ability to think critically and age; ability to think critically and courses completed in post secondary education in the human sciences; and ability to think critically and GPA from post high school education. There were no significant

relationships found between ability to think critically and scores measuring ability to perform selected psychomotor skills, ability to think critically and high school GPA, or ability to think critically and GPA from previous courses taken in higher education. There were no significant differences found between ability to think critically and gender or ability to think critically and previous experience as a nursing assistant. Findings were discussed and implications for nursing education and recommendations for future research were given.

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APPENDIX A

Critical Skill Performance Checklist

MERCY SCHOOL OF NURSING
STUDENT EXPERIENCE IN CLINICAL SKILLS (LAB COPY)

STUDENT_____ CLASS OF_____

CRITICAL SKILLS

		Instructor Initials	Date
1.	Handwashing	_____	_____
2.	Meal service	_____	_____
3.	Nurse body mechanics	_____	_____
4.	Unoccupied bed	_____	_____
5.	Bed bath	_____	_____
6.	Occupied bed	_____	_____
7.	Oral and rectal temperature, pulse, and respiration	_____	_____
8.	Blood pressure	_____	_____
9.	Apical pulse	_____	_____

Nursing 100

1. Handwashing

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Removed jewelry and pushed clothing or wristwatch above wrist level.			
2. Kept fingernails short and filed.			
3. Stood at sink without touching sink with hands or uniform.			
4. Used paper towel to turn on faucet.			
5. Avoided splashing.			
6. Adjusted water temperature to "warm".			
7. Wet hands and lowered arms, keeping them lower than the elbows.			
8. Applied antiseptic liquid soap to hands.			
9. Lathered hands and applied friction to skin surfaces for 10-15 seconds on each hand and interlaced fingers and rubbed palms and back of hands in circular motion.			
10. Cleaned thoroughly under fingernails.			
11. Rinsed thoroughly, keeping hands below elbows.			
12. Dried hands thoroughly, wiping from fingers up to wrists and forearms.			
13. Discarded paper towel properly.			
14. Turned off water at sink using a dry papertowel.			

Instructor:

Nursing 100
2. Meal Service

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Assessed tray for completeness and correct diet.			
2. Checked ID band. Prepared tray for client.			
3. Placed towel under client's chin if needed.			
4. Set client up in chair or bed.			
5. Determined how well client was eating independently.			
6. Cut food into bite-sized pieces.			
7. Fed client and offered fluids in order of client's preferences.			
8. Talked with client.			
9. Offered assistance with hygiene.			
10. Assisted client to resting position.			
11. Returned client's tray.			
12. Washed hands.			
13. Verbalized need to record dietary and fluid intake.			

Instructor:

Nursing 100
3. Nurse Body Mechanics

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Uses proper body alignment and balance.			
2. Adjusts working area to waist level and keeps body close to area.			
3. Faces the direction of the force.			
4. Moves body as single unit by pivoting.			
5. Works with gravity using smooth and rhythmic body movements.			
6. Carries objects close to the body and near the base of support.			
7. Distributes body weight on front foot and ball of back foot, tightens gluteal and femoral muscles in squatting position when lifting heavy loads.			
8. Shifts body weight appropriately when pushing or pulling objects.			
9. Encourages client participation in move when needed.			
10. Uses appropriate mechanical aids or personnel when indicated.			

Instructor:

Nursing 100
4. Unoccupied bed

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Washed hands.			
2. Assembled all necessary equipment with linen stacked in order of use. Removed furniture and equipment from around bed before making.			
3. Lowered side rails and removed call light from bed.			
4. Adjusted bed to a comfortable working height position.			
5. Loosened all soiled linen from under mattress.			
6. Removed bedspread and blanket separately and discarded properly; did not shake or allow linen to come in contact with uniform.			
7. When reusing blanket or spread, folded each correctly into square.			
8. Removed soiled pillowcases correctly by slipping each pillow out from case.			
9. Spread mattress pad over mattress.			
10. Smoothed out all wrinkles in pad.			
11. Applied bottom sheet correctly to bed, one side at a time, keeping seam edge down.			
12. Made mitered corner in top corner of bottom sheet.			
13. Tucked bottom sheet tightly under mattress.			
14. Applied drawsheet to bed correctly.			
15. Moved to opposite side of bed.			
16. Spread fanfolded bottom sheet smoothly over bed.			
17. Mitered top corner of bottom sheet.			
18. Used good body mechanics by keeping back straight while tucking linen tightly under mattress.			

4. Unoccupied Bed Continued

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
19. Smoothed folded drawsheet over bottom sheet.			
20. Applied all top linen to one side of bed at a time.			
21. Made cuff out of top edge of sheet and bedspread.			
22. Correctly tucked bottom linen together under mattress at foot of bed.			
23. Made a modified mitered corner at bottom edge of mattress.			
24. Correctly applied a clean pillowcase over pillow.			
25. Placed pillow at center of head of bed.			
26. Placed call light within client's reach. Returned bed to low position, raised top side rails.			
27. Fanfolded linen down to bottom third of bed.			
28. Discarded dirty linen properly. Washed hands.			

Instructor:

Nursing 100
5. Bedbath

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Washed hands.			
2. Provides oral care.			
3. Positioned client to avoid strain on nurse.			
4. Used bath blanket properly while removing top linens of bed.			
5. Disposed of soiled linen correctly.			
6. Removed client's gown correctly.			
7. Raised side rail and filled washbasin two-thirds full; checked temperature of bathwater and client's tolerance.			
8. Placed towel over client's chest.			
9. Folded washcloth into mitt.			
10. Washed and dried client's eyes correctly (without using soap).			
11. Washed, rinsed, and dried client's forehead, cheeks, nose, neck, and ears using or avoiding soap as appropriate.			
12. Removed bath blanket from client's arm and placed bath towel under arm.			
13. Bathed client's arm and axilla.			
14. Rinsed and dried arm and axilla thoroughly; provided deodorant (or talcum powder if used by client).			
15. Followed procedure for soaking and drying client's hand.			
16. Repeated Steps 13-15 for other arm.			
17. Placed bath towel and blanket correctly for washing client's chest.			
18. Washed, rinsed, and dried chest correctly.			

5. Bedbath continued

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
19. Placed bath towel and blanket correctly for washing client's abdomen.			
20. Washed, rinsed, and dried abdomen correctly.			
21. Applied clothing if appropriate to maintain client's warmth and comfort.			
22. Draped client correctly for washing leg.			
23. Followed procedure for placing towel under client's leg.			
24. Asked client to hold foot still while positioning basin near foot.			
25. Placed foot in basin and allowed to soak while washing leg.			
26. Washed leg and foot. Dried well.			
27. Repeated Steps 22-26 for other leg and foot.			
28. Covered client with bath blanket and changed bathwater.			
29. Positioned client correctly for bathing back and buttocks.			
30. Applied disposable gloves.			
31. Kept client properly draped for bathing back and buttocks.			
32. Washed, rinsed, and dried client's back from neck to buttocks.			
33. Changed bathwater and washcloth.			
34. Positioned and draped client in correct position for washing genitalia; washed, rinsed, and dried perineum or allowed client to do so.			
35. Disposed of gloves.			
36. Applied or offered to apply moisturizing lotion to skin.			
37. Assisted client in dressing.			

5. Bedbath continued

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
38. Combed client's hair.			
39. Disposed of soiled linen properly; cleaned and replaced bathing equipment; replaced call light and personal possessions.			
40. Washed hands.			

Instructor:

Comleted peri care on lab model:

Instructor:
Date:

Nursing 100
6. Occupied Bed

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
1. Washed hands.			
2. Assembled equipment with linen stacked in order of use.			
3. Lowered side rail on side working and removed call light.			
4. Adjusted bed to comfortable working height.			
5. Loosened top linen sheet at foot of bed.			
6. Removed blanket or spread, folded each correctly into a square. While removing soiled linen from bed, did not allow linen to come in contact with uniform.			
7. Covered client with bath blanket and removed top sheet without exposing body parts.			
8. Assisted client to side-lying position after elevating siderail.			
9. Loosened bottom linen from head to foot of bed.			
10. Fanfolded soiled bottom and drawsheet and tucked them under client's shoulders, back and buttocks.			
11. Applied clean bottom linen to one side of bed at a time.			
12. Correctly made mitered corner in top corner of bottom sheet.			
13. Tucked bottom sheet tightly under mattress.			
14. Put drawsheet in place correctly.			
15. Raised side rail on working side and moved to other side of bed.			
16. Lowered side rail and assisted client in rolling over folds of linen.			
17. Loosened edges of soiled linen from underneath mattress.			

6. Occupied Bed Continued

Check one of the following for each criteria:	Satisfactory	Corrected by Student	Unsatisfactory
18. Discarded linen correctly in linen bag.			
19. Spread clean fanfolded linen smoothly over edge of mattress from head to foot of bed.			
20. Positioned client supine on bottom linen.			
21. Tucked bottom sheet tightly under mattress.			
22. Placed top sheet over client and unfolded from head to foot.			
23. Removed bath blanket and discarded it into linen bag.			
24. Placed bedspread correctly on bed.			
25. Made cuff out of top edge of sheet, blanket, and bedspread.			
26. Tucked top sheet, blanket, and spread under mattress.			
27. Made modified mitered corner with top sheet and spread.			
28. Raised side rail. Made other side of bed.			
29. Removed and discarded soiled pillow case. Correctly applied clean pillow case over pillow.			
30. Repositioned pillow under client's head.			
31. Placed call light within client's reach and returned bed to comfortable position.			
32. Discarded linen bag properly. Washed hands.			

Instructor:

APPENDIX B

Consent Form

September 25, 1992

Mercy School of Nursing
928 6th Avenue
Des Moines, IA 50309

Dear Freshman Student:

As part of my requirements for the Master of Science in Nursing degree at Drake University, I am conducting a study on the relationships among critical thinking, psychomotor skill performance and selected educational, experiential and demographic variables in freshmen nursing students. I am requesting your participation in this study. This information will be very useful for nurse educators as we evaluate our teaching-learning methods and outcomes of our nursing programs. It is on the basis of such data that educational programs can be improved to meet the needs of nursing students and the profession of nursing.

As you are aware, all freshmen nursing students at Mercy School of Nursing are required to complete the Watson Glaser Critical Thinking Appraisal (WGCTA) within the first four weeks of the fall term. You are also required to learn and perform skills in the Nursing Arts Laboratory that are commonly used in nursing practice. Your performance on these skills in the laboratory are recorded on the Critical Skills Performance Checklist (CSPC).

I am requesting your permission to use the scores you receive on the WGCTA and the CSPC for my study. I am also requesting your permission to review your information file for demographic, experiential and prior educational data. Your participation in this study will not require additional work or time on your part.

Information about your scores on the WGCTA and CSPC and data obtained from your information file will be kept in confidence. All data will be reported in group form; you will not be identified personally. Neither your grade nor progress in the program will be affected in any way whether you choose or decline to participate in the study. You may choose to have data about you withdrawn from the study at any time during the fall term.

If you have questions regarding this consent form or the study you may contact me at 247-3180 at Mercy School of Nursing.

If you choose to participate in the study, please sign one of these two letters on the line below and return this letter to me.

_____

Name Date

_____

Witness Date

If you choose to participate in the study, please indicate if you would like an abstract of the study when it is completed.

Yes_____ No_____

Thank you very much for considering participation in the study.

Sincerely,

Joan McCleish, R.N., B.S.N.

APPENDIX C

TABLES

Table C-1
RELATIONSHIP BETWEEN CSPC SCORES AND THE NUMBER OF POST SECONDARY COURSES TAKEN

	r
Total Previous Courses	-0.119
Behavioral Science Courses	0.159
Natural Science Courses	0.052
Humanity Courses	

Table C-2
RELATIONSHIP BETWEEN CSPC SCORES AND GPA

	Mean	r
High school GPA	2.716	-0.005
Post Secondary Education GPA	3.016	-0.082

Table C-3
RELATIONSHIP BETWEEN AGE AND NUMBER OF POST SECONDARY COURSES COMPLETED

	r
Total Previous Courses	0.146
Behavioral Science Courses	0.237*
Natural Science Courses	0.063
Humanity Courses	-0.014

* $p < 0.05$

Table C-4
RELATIONSHIP BETWEEN AGE AND GPA

	r
High School GPA	-0.266*
Post Secondary Education GPA	0.203

* $p < 0.05$